

REMARKS

Claims 4, 7, 13, 57, 60, 61, 66, 71, 76, and 81 have been canceled.

Claim 1 has been amended to specify that the coalescent aid comprise an ester derived from a fatty acid of an oil of plant or animal origin, the ester having the formula RCOOX wherein R is hydrocarbyl or substituted hydrocarbyl and comprises at least two unsaturated carbon-carbon bonds and X is -C₂H₄OH, -C₂H₄OC₂H₄OH, -C₃H₆OH, or -C₃H₆OC₃H₆OH. Support may be found at page 7, lines 21-24 of the specification.

Claim 8 has been amended to depend from claim 1.

Claim 19 has been amended to correct a typographical error.

Claims 22, 23, 32, 33, 37, and 38 have been amended to read consistently with claim 1.

I. Non-Obviousness Under 35 U.S.C. 103(a)

Reconsideration is requested of the rejection of claims 1-3, 8-12, 14-19, 21, 26-32, 34-36, 39, 42-44, 49-51, and 54-56 under 35 U.S.C. 103(a) as being unpatentable over Bors et al. For a *prima facie* case of obvious to be established, cited references must describe all the elements of the applicant's invention and suggest or provide a motivation to modify or combine the cited references in a manner that teaches or suggests all of the claim requirements. Furthermore, a reasonable expectation of success in the combination must be found in the prior art. MPEP §§ 2143-2143.03.

Claim 1, as amended, is directed to a film-forming composition comprising a continuous aqueous phase and a dispersed phase. The dispersed phase comprises (i) a particulate polymer or emulsified liquid prepolymer, and (ii) a coalescent aid comprising an ester derived from a fatty acid of an oil of plant or animal origin, the ester having the formula RCOOX wherein R is hydrocarbyl or substituted hydrocarbyl and comprises at least two unsaturated carbon-carbon bonds and X is -C₂H₄OH, -C₂H₄OC₂H₄OH, -C₃H₆OH, or -C₃H₆OC₃H₆OH. The specification, at page 1, lines 17-20, discloses that coalescent aids coalesce particulate polymers and liquid pre-polymers and form an integral film at ambient temperatures.

Bors et al. disclose vinyl polymer films that are cross-linked after film formation. Bors et al. disclose vinyl polymers with pendant acetoacetate groups as preferred polymers. See col. 2, lines 14-17. Bors et al. also disclose that a key element to the technology of the invention is that the film forming composition comprise an aerobic radical source, which in most cases is an autoxidizeable substance. See col. 5, lines 29-32. Examples of autoxidizeable substances include, *inter alia*, simple esters of

drying oil fatty acids such as the ethyl ester of linseed oil fatty acid. Col. 5, lines 60-61. The autoxidizeable substance, however, does not react with pendant acetoacetate groups present in the polymer.

While Bors et al. disclose that simple esters of drying oil fatty acids such as the ethyl ester of linseed oil fatty acid may be included as autooxidizeable components, they do not disclose or suggest incorporating a coalescent aid comprising a ethylene glycol, diethylene glycol, propylene glycol, or dipropylene glycol ester ($-C_2H_4OH$, $-C_2H_4OC_2H_4OH$, $-C_3H_6OH$, or $-C_3H_6OC_3H_6OH$) of a fatty acid of an oil of plant or animal origin. Furthermore, the simple esters do not become an integral part of the polymer film. Thus, the simple esters disclosed by Bors. et al. do not correspond to the coalescent aids required by claim 1.

As Bors et al. do not disclose all the elements of claim 1 and the claims that depend therefrom, the Office has not established a *prima facie* case of obviousness under 35 U.S.C. 103(a). Accordingly, claims 1-3, 8-12, 14-19, 21, 26-32, 34-36, 39, 42-44, 49-51, and 54-56 are patentable over the cited art.

II. Supplemental Information Disclosure Statement

The Applicants filed a Supplemental Information Disclosure Statement on August 19, 2004 submitting references that were cited in an Opposition against a European application counterpart of the present application.

Boege et al., U.S. Application Publication No. 2003/0188828, was submitted as an English-language counterpart to the Boge et al. German patent no. DE 19531849, which was cited in the Opposition. Boege et al. disclose polystyrene binders modified by certain fatty acid derived plasticizers.¹ Boege et al. disclose that "fatty acids" in the context of the patent include:

"...acids which contain one or more carboxyl groups ($-COOH$). The carboxyl groups may be attached to saturated, unsaturated, unbranched or branched alkyl radicals containing more than 8 carbon atoms and, in particular, more than 12 carbon atoms. In addition to the $-OH$, $-SH$, $-C=C-$, $-COOH$, amino, anhydride groups or epoxide groups described above, they may contain other groups, such as ether, ester, halogen, amide, amino, urethane and urea groups. However, carboxylic acids, such as native fatty acids or fatty acid mixtures, dimer fatty acids and trimer fatty acids are preferred. Specific examples of the fatty acids apart from the saturated types are, in particular, the monounsaturated or polyunsaturated acids palmitoleic, oleic, elaidic,

¹See page 1, paragraph 0010 of U.S. Pub. No. 2003/0188828.

petroselic, erucic, ricinoleic, hydroxymethoxystearic, 12-hydroxystearic, linoleic, linolenic and gadoleic acid."²

"Products emanating from the guerbetization of linear saturated or unsaturated fatty alcohols with subsequent oxidation may also be used as fatty acids. Examples include 2-ethyl hexanoic acid, 2-butyl octanoic acid, 2-hexyl decanoic acid, 2-decyl tetradecanoic acid, 2-tetradecyl octadecanoic acid, 2-hexadecyl-C20-acid or mixtures thereof. In addition, isostearic acid as a secondary product of the dimerization of fatty acids is also suitable."³

Boege et al. also disclose that polyhydroxyfatty acids may also be used in addition to the naturally occurring fatty acids. Such compounds may be obtained

"by epoxidation of unsaturated fats and oils or esters of fatty acids with alcohols, ring opening with H-active compounds, for example alcohols, amines and carboxylic acids, and subsequent saponification. The fats or oils required as starting material may be both of vegetable origin and of animal origin or may optionally be obtained by particular petrochemical syntheses."⁴

Boege et al. further disclose that:

"[t]he fatty acids may also be derived from oil- and fat-based raw materials obtainable, for example, by ene reactions, Diels-Alder reactions, transesterifications, condensation reactions, grafting (for example with maleic anhydride or acrylic acid, etc.) and epoxidations. Examples of corresponding raw materials are: a) epoxides of unsaturated fatty acids, such as palmitoleic acid, oleic acid, elaidic acid, petroselic acid, erucic acid, linoleic acid, linolenic acid, gadoleic acid; b) reaction products of unsaturated fatty acids with maleic acid, maleic anhydride, methacrylic acid or acrylic acid; c) condensation products of hydroxycarboxylic acids, such as ricinoleic acid or 12-hydroxystearic acid, and polyhydroxycarboxylic acids."⁵

Boege et al. disclose examples of preferred fatty acid esters:

"the natural fats and oils of rape (new and old), sunflowers, soya, linseed, castor, coconuts, oil palms, oil palm kernels and oil trees and methyl esters thereof. Preferred fats and oils are, for example, beef tallow with a chain distribution of 67% oleic acid, 2% stearic acid, 1% heptadecanoic acid, 10% saturated C₁₂ to C₁₆ acids [sic], 12% linoleic acid and 2% saturated acids containing more than 18 carbon atoms or, for example, the oil of new

²U.S. Pub. No. 2003/0188828, paragraph 0015.

³U.S. Pub. No. 2003/0188828, paragraph 0016.

⁴U.S. Pub. No. 2003/0188828, paragraph 0017.

⁵U.S. Pub. No. 2003/0188828, paragraph 0018.

sunflowers (NSf) with a composition of around 80% oleic acid, 5% stearic acid, 8% linoleic acid and around 7% palmitic acid. The corresponding epoxides and reaction products with maleic anhydride, for example, may of course also be used. Other examples are partly and completely dehydrated castor oil, partly acetylated castor oil, ring opening products of epoxidized soybean oil with dimer fatty acid."⁶

Boege et al. also disclose that:

"fatty acid esters and derivatives thereof obtainable by epoxidation may also be used. Examples of such esters are soybean oil fatty acid methyl ester, linseed oil fatty acid methyl ester, ricinoleic acid methyl ester, epoxystearic acid methyl ester, epoxystearic acid-2-ethylhexyl ester. Preferred glycerides are triglycerides, for example rapeseed oil, linseed oil, soybean oil, castor oil, partly and completely dehydrated castor oils, partly acetylated castor oil, soybean oil epoxide, linseed oil epoxide, rapeseed oil epoxide, epoxidized sunflower oil."⁷

Examples of fats and oils derivatives obtained through epoxidation or by the addition of maleic anhydride or acrylic acid include:

"palm oil, peanut oil, rapeseed oil, cottonseed oil, soybean oil, castor oil, partly and completely dehydrated castor oils, partly acetylated castor oils, sunflower oil, linseed oil, stand oils, blown oils, epoxidized soybean oil, epoxidized linseed oil, rapeseed oil, coconut oil, palm kernel oil and tallows."⁸

Although Boege et al. disclose multiple lists of potential fatty acids, fatty alcohols, and esters, when they come to their working examples, they are much more modest. They merely exemplify a relatively small group of oils, acids, and esters. In particular, the exemplified esters of plant derived polyunsaturated fatty acids is limited to rapeseed oil fatty acid methyl ester.⁹ Notably, Boege et al. fail to exemplify or even disclose or suggest unsaturated fatty acid esters such as the ethylene glycol, diethylene glycol, propylene glycol, or dipropylene glycol esters of an oil of plant or animal origin required by claim 1; stated another way, Boege et al. provide a person of ordinary skill with no reason to select the esters required by claim 1 for use as a coalescent aid in a film-forming composition.

⁶U.S. Pub. No. 2003/0188828, paragraph 0023.

⁷U.S. Pub. No. 2003/0188828, paragraph 0024.

⁸ U.S. Pub. No. 2003/0188828, paragraph 0026.

⁹ See page 4, paragraph 0053; page 5, paragraph 0069, Table 1; and page 6, paragraph 0085 of U.S. Pub. No. 2003/0188828.

In contrast, the examples appearing in Applicants' specification demonstrate certain advantages of the ethylene glycol, diethylene glycol, propylene glycol and dipropylene glycol esters of claim 1. In particular, Example 8 illustrates that the ethylene glycol soybean oil derivative, (EG), diethylene glycol soybean oil derivative (DEG), propylene glycol soybean oil derivative (PG), dipropylene glycol soybean oil derivative (DPG) have lower Hydrophilic Lipophilic Balance values (HLB values) (2.7-5.9) than ethylene glycol mono butyl ether (EB) (14.9). According to Blackley, *Emulsion Polymerisation: Theory and Practice*, p. 314 (1975),¹⁰ compounds having HLB values of 1-4 have no dispersibility in water and compounds having HLB values of 3-6 have poor dispersion in water.

Applicants have also found that EG, DEG, PG, and DPG have similar solubility parameters to that of the resin used in paint. In contrast, oils, such as sunflower, soybean, and other polyunsaturated oils are not compatible with these resins due to a mismatch in solubility parameters.

Fatty acid ester coalescent aids that have low HLB values and similar solubility parameters to that of the resin used in paint would cause them to be predominantly dissolved in the dispersed phase and not in the continuous water phase. Thus, relatively low HLB values and such solubility parameters cause the ethylene glycol, diethylene glycol, propylene glycol, and dipropylene glycol esters ($-C_2H_4OH$, $-C_2H_4OC_2H_4OH$, $-C_3H_6OH$, or $-C_3H_6OC_3H_6OH$) of claim 1 to be superior coalescent aids.

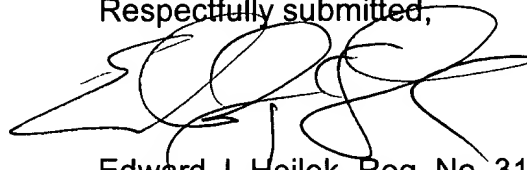
In view of the foregoing, favorable reconsideration and allowance of all claims is requested.

¹⁰See Exhibit B of the Declaration of Michael R. Van De Mark and Nantana Jiratumnukul, filed February 17, 2003

CONCLUSION

* A check for \$430.00 is enclosed to cover the fee for a two-month extension of time up to and including today's date. The Commissioner is hereby authorized to charge any underpayment and credit any overpayment of government fees to Deposit Account No. 19-1345.

Respectfully submitted,

A handwritten signature in black ink, appearing to be 'EJH', written over a circular stamp or seal.

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